

### **REMARKS**

Claims 1-52 are pending in the above identified application. The Examiner has rejected claims 1-8, 10-20, 27-40, and 43-52 and objected to claims 9, 21-26, 41, and 42. Applicant has amended claims 1, 2, 15, 16, 19, 27, 34, 44, 45, 46, 48, and 51 and canceled claims 12, 18, and 36. No new matter has been added by these amendments.

### **Objections to the Drawings**

The Examiner has objected to the drawings because "Figures 1A-1C should be designated by a legend such as --Prior Art-- because only that which is old is illustrated." (Office Action, page 2). Applicant has amended drawings 1A through 1C accordingly.

### **The Specification**

The Examiner has requested Applicant's cooperation in correcting any errors of which applicant may become aware in the specification. (See Office Action, page 2). Applicant has reviewed the specification and has not made any amendments herein.

### **Objections to the Claims**

The Examiner has objected to claim 46 and suggests that "applicant insert 'to' between coupled and received in line 5 of the claim." (Office Action, page 2). Applicant has made the requested amendment to claim 46.

### **Claim Rejections under 35 U.S.C. § 102**

The Examiner states that claims 1-6, 12, 15, 27, 29-31, 34, 36-37, and 44-45 are rejected "under 35 U.S.C. 102(b) as being anticipated by Rowan et al. (WO 99/45683)." (Office Action,

page 3). However, the Examiner addresses claims 1-6, 12-15, 19-20, 27-40, and 43-45 in the discussion of the rejections under 35 U.S.C. § 102(b). (*See* Office Action, page 3-8).

Rowan teaches “[a] system [that] transmits digital data over an optical fiber at high aggregate data rates and high bandwidth efficiencies.” (Rowan, abstract). As stated in Rowan,

[i]n accordance with the present invention, a system for transmitting digital data over an optical fiber includes a modulation stage, a frequency division multiplexer, and an optical modulator. The modulation stage receives a plurality of digital data channels and applies QAM modulation to produce a plurality of QAM-modulated signals. The frequency division multiplexer combines the QAM-modulated signals by frequency division multiplexing them into an RF signal. The RF signal is input to the optical modulator, which generates an optical signal modulated by the RF signal, for transmission over an optical fiber.

(Rowan, page 3, lines 22-28). Further, Rowan teaches that

[i]n accordance with another aspect of the invention, a system for receiving digital data over an optical fiber includes a detector, a frequency division multiplexer, and a demodulation stage. The detector detects the optical signal produced by the transmitter system described previously, producing an RF signal. The frequency division demultiplexer separates the RF signal into its constituent QAM-modulated signals by frequency division demultiplexing. The demodulation stage converts the QAM-modulated signals into the original digital data channels.

(Rowan, page 4, lines 11-17). Therefore, Rowan teaches frequency-division multiplexing of QAM modulated signals over an optical fiber. Rowan does not teach “the transmitter coupled to . . . transmit the N parallel bits of data into K frequency separated channels on a conducting transmission medium,” as is recited in claim 1, “coupling the transmit sum signal to the conducting transmission medium,” as is recited in claim 27, “means for transmitting . . . into one of K channels on a conducting transmission medium,” as is recited in claim 44, or “the transmitter portion coupled to . . . transmit the N parallel bits of data into a first set of K frequency separated channels on a conducting transmission medium,” as is recited in claim 46.

Instead, Rowan teaches transmission over optical fiber rather than over “a conducting transmission medium.”

As stated in Rowan,

[t]he present invention is particularly advantageous because the combination of QAM modulation and frequency division multiplexing allows the transmission of digital data over optical fibers at high aggregate data rates and with high bandwidth efficiencies while using lower speed electronics. For example, the preferred embodiment described above has an aggregate data rate of approximately 10 Gbps and a bandwidth efficiency of approximately 4 bps/Hz, but the associated electronics need only support the 155 Mbps OC-3 data rate rather than the 10 Gbps aggregate rate.

(Rowan, page 4, lines 18-24). Rowan’s teaching regarding transmission over optical fiber at these data rates is not applicable to transmission over conducting transmission medium because of the more prominent affects of distortions that are observed in the conducting transmission medium.

Without addressing each of the statements made by the Examiner in support of the Examiner’s rejections, Applicant disagrees and does not acquiesce to the Examiner’s analysis of Rowan. For example, the Examiner has incorrectly identified element 914A in Figure 9B of Rowan as an Equalizer, which corrects the signal for intersymbol interference (one of the distortions that is prevalent in transmission over conducting transmission medium but not over optical fiber). (See Office Action, page 5). As stated by the Examiner,

[f]urthermore, Rowan et al. also discloses in Figs. 9B, 11 wherein at least one of the K demodulators comprises: a down-conversion circuit (912A) that receives the signal from the transmission medium and generates a symbol by converting the signal at the carrier frequency appropriate for the one of the K demodulators; an equalizer circuit (914A) coupled to receive the symbol from the down-conversion circuit and create an equalized symbol; and a decoder (1100) which receives the equalized symbol and retrieves the one of the K subsets of bits associated with the at least one of the K demodulators.

(Office Action, page 5). As taught in Rowan, “[b]andpass filters 914 filter out the signal at the common carrier frequency.” (Rowan, page 14, line 24). Therefore, the element identified by the Examiner as an equalizer is simply a bandpass filter. An equalizer corrects the signal for intersymbol interference and therefore a bandpass filter is not an equalizer.

The Examiner also cites page 7, lines 4-21, of Rowan as evidence that Rowan “discloses in Fig. 9B, an analog-to-digital converter coupled between the down converter and the equalizer.” (Office Action, page 5) However, equalization is not mentioned in that paragraph. Further, in Figure 9B, the bandpass filter 914 (identified by the Examiner as the Equalizer) is located before the analog-to-digital converter.

As another example, the Examiner further cites Fig. 9B for disclosing “anti-aliasing filtering prior to analog-to-digital conversion.” (Office Action, page 7). However, there is no teaching in Rowan regarding anti-aliasing filtering. Rowan only teaches the bandpass filter 914.

Therefore, as discussed above, Rowan does not teach “the transmitter coupled to . . . transmit the N parallel bits of data into K frequency separated channels on a conducting transmission medium,” as is recited in claim 1, “coupling the transmit sum signal to the conducting transmission medium,” as is recited in claim 27, “means for transmitting . . . into one of K channels on a conducting transmission medium,” as is recited in claim 44, or “the transmitter portion coupled to . . . transmit the N parallel bits of data into a first set of K frequency separated channels on a conducting transmission medium,” as is recited in claim 46. Instead, Rowan teaches transmission of data over optical fiber. Further, Rowan does not teach “an equalizer circuit” as is recited in claim 19 or an “anti-aliasing filter” as is recited in claim 40. Therefore, claims 1, 27, 44, and 46 are allowable over Rowan. Further, claims 19 and 40 are allowable over Rowan.

Claims 2-6, 12-15, and 19-20 depend, directly or indirectly, from claim 1 and are therefore allowable over Rowan for at least the same reasons as is claim 1. Claims 28-40 and 43 depend, directly or indirectly, from claim 27 and are therefore allowable over Rowan for at least the same reasons as is claim 27. Claim 45 depends from claim 44 and is therefore allowable over Rowan for at least the same reasons as is claim 44. Claim 47-50 depend, directly or indirectly, from claim 46 and are therefore allowable over Rowan for at least the same reasons as is claim 46. Therefore, claims 1-6, 12-15, 19-20, 27-40, and 43-50 are allowable over Rowan.

### **Claim Rejections Under 35 U.S.C. § 103**

#### **Claims 7-8 and 10-11**

The Examiner rejected claims 7-8 and 10-11 “under 35 U.S.C. 103(a) as being unpatentable over Rowan et al. (WO 99/45683) as applied to claims 1 and 4 above in view of Frenkel (US Patent 5,838,268). (Office Action, page 8). Applicant disagrees with the Examiner because 1) the combination of Frenkel and Rowan do not teach the elements of the claims, as is suggested by the Examiner; and 2) there is no motivation to combine the teachings of Frenkel and Rowan.

Further, Applicant does not agree with the Examiner’s analysis of Frenkel and does not acquiesce to the Examiner’s comments, whether or not those comments are specifically discussed here. As an example, the Examiner cites to col. 8, lines 39-51 of Frenkel to show that Frenkel teaches a transmission medium is a copper backplane and the transmitter includes a differential output driver and that Frenkel teaches that the transmission medium is FR4 copper trace and the transmitter includes a differential output driver. (Office Action, page 9). Frenkel simply states that “the demodulation system of FIG. 2 are particularly suitable for packetized data-over-cable applications such as coax and HFC (hybrid fiber coax) applications . . . .”

(Frenkel, col. 8, lines 46--48). No teaching of a differential output, transmission over FR4 copper, or transmission over a copper backplane is provided, as is stated by the Examiner.

*1. The combination of Rowan with Frenkel does not teach the elements of the claims.*

As stated above, all of the elements of claims 1 and 4 are not taught by Rowan. Further, Frenkel does not cure the defects in the teachings of Rowan. Frenkel teaches

[a] signal modulation method comprising receiving at least first and second synchronized incoming streams of complex symbols, thereby to define a plurality of incoming vectors each including at least first and second synchronized complex symbols, mapping each complex symbol into a signal component comprising a linear combination of an in-phase signal and a quadrature signal, the quadrature signal comprising a Hilbert transform of said in-phase signal, wherein all of the signal components are substantially mutually orthogonal and wherein the frequency spectrums of all signal components mapped from a single incoming stream are centered around a common frequency location which is unique to the single incoming stream and wherein the frequency spectrum of signal components mapped from different incoming streams having adjacent common frequency locations are partially overlapping and wherein signal components mapped from sequential incoming symbols partially overlap in time and combining all of the signal components into a representation of an output signal.

(Frenkel, abstract). Therefore, Frenkel teaches that each individual symbol stream is transmitted at a unique carrier frequency. Therefore, the combination of Frenkel and Rowan does not teach “the transmitter coupled to . . . transmit the N parallel bits of data into K frequency separated channels on a conducting transmission medium,” as is recited in claim 1. Therefore, the combination of Frenkel with Rowan still does not teach the elements of claims 7-8 and 10-11, which depend either directly or indirectly from claim 1.

*2. There is no motivation to combine the teachings of Rowan and Frenkel.*

Further, there is no motivation to combine the teaches of Rowan with that of Frenkel, as is suggested by the Examiner. Rowan teaches “[a] system [that] transmits digital data over an optical fiber at high aggregate data rates and high bandwidth efficiencies.” (Rowan, abstract). Frenkel teaches “improved methods and apparatus for modulating and demodulating data.” Frenkel, col. 2, lines 25-26). As stated in Frenkel,

[o]ne object of a preferred embodiment of the present invention is to provide a modulation/demodulation scheme with improved bandwidth efficiency, sharp ingress rejection, robustness to time and phase errors and low latency, which is therefore suitable for reliable continuous transmission of packets in multi-point systems such as HFC (hybrid fiber coax).

(Frenkel, col. 2, lines 27-33). Further, Frenkel’s modulation scheme operates on a single bit stream and not on a set of parallel bits, as is taught in Rowan. (*See, e.g.*, Frenkel, Figure 1). One of ordinary skill in the art would not be motivated to combine teachings related to transmission over optical fiber with transmission over a conducting transmission medium.

Therefore, claims 7-8 and 10-11, which depend directly or indirectly from claims 1 and 4, are therefore allowable over the combination of Rowan and Frenkel.

#### Claims 16, 17, and 18

The Examiner has further rejected claims 16, 17, and 18 “under 35 U.S.C. 103(a) as being unpatentable over Rowan et al. (WO 99/45683) as applied to claim 15 above in view of van Nguyen (US Patent 6,462,679 B1).” (Office Action, page. 9). Applicant does not agree or acquiesce to the Examiner’s characterization of Nguyen.

Claim 18 has been canceled.

Claims 16 and 17 depend, directly or indirectly, from claim 1, which as discussed above is allowable over Rowan. Nguyen does not cure the defects in the teachings of Rowan. Nguyen teaches “a method for modulating a signal that includes generating a sinusoidal wave signal and

encoding each half wave cycle of the sinusoidal wave signal with digital data.” (Nguyen, col. 1, lines 64-66). Nguyen does not teach “the transmitter coupled to . . . transmit the N parallel bits of data into K frequency separated channels on a conducting transmission medium,” as is recited in claim 1.

Further, there is no motivation to combine Rowan with Frenkel. Rowan teaches a complex modulation scheme for transmission of optical signals over fiber optic cable. Frenkel teaches encoding digital data in the amplitudes of the sine wave. One skilled in the art would not be motivated to combine the teachings of Frenkel with that of Rowan.

#### Claims 46-52

The Examiner has rejected claims 46-52 “under 35 U.S.C. 103(a) as being unpatentable over Rowan et al. (WO 99/45683) in view of Widmer (US Patent 6,496,540 B1).” As before, whether or not discussed below, Applicant does not agree or acquiesce to the Examiner’s characterization of Widmer.

As discussed above, claim 46 is allowable over Rowan. Widmer does not cure the defects in the teachings of Rowan. Widmer teaches “a system and method for transforming uncoded parallel interfaces into coded format while maintaining a baud-rate of the uncoded parallel interface.” (Widmer, col. 4, lines 34-36). As is shown in Figure 1 and the accompanying discussion, Widmer shows a system where parallel data streams are input, processed, and output on individual transmission lines so as to maintain the baud rate. (*See* Widmer, col. 4, line 64, to col. 5, line 1). Therefore, Widmer does not teach “the transmitter portion coupled to . . . transmit the N parallel bits of data into a first set of K frequency separated channels on a conducting transmission medium,” as is recited in claim 46. Claim 46, therefore, is allowable over the combination of Rowan and Widmer. Claims 47-52 depend from claim 46

and are therefore allowable over the combination of Rowan and Widmer for at least the same reasons as is claim 46.

Further, there is no motivation to combine Rowan with Widmer. Rowan teaches a complex modulation scheme for transmission of data “over an optical fiber at high aggregate data rates and high bandwidth efficiencies.” (Rowan, abstract). Widmer teaches recombining data streams in order to maintain the baud rate. One skilled in the art would not be motivated to combine the teachings of Rowan with those of Widmer.

#### **Allowed Subject Matter**

The Examiner has allowed claims 9, 21-26, and 41-42, provided that they are rewritten in independent form including all of the limitations of the base claims and any intervening claims. As discussed above, the base claims and intervening claims are allowable. Therefore, claims 9, 21-26, and 41-42 have not been amended to be independent in this paper.

### Conclusion

In view of the foregoing amendments and remarks, Applicant respectfully requests reconsideration and reexamination of this application and the timely allowance of the pending claims.

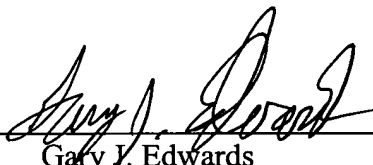
Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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Dated: August 10, 2005

By: \_\_\_\_\_



Gary J. Edwards

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Attachments: Annotated Sheet of Drawings showing changes

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**AMENDMENTS TO THE DRAWINGS:**

The attached sheet of drawings includes changes to Figures 1A-1C. Figures 1A-1C have been modified to include the legend -- Prior Art--, as was suggested by the Examiner.

Attachments:           Annotated Sheet showing changes